

# “He hasn’t done much to keep it up”: Annotating topoi in the balloon task

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## Abstract

We present a preliminary study of the topoi employed by people with a diagnosis of schizophrenia in triadic dialogues discussing a moral dilemma with people who are unaware of their diagnosis. Results support the hypothesis that people with a diagnosis of schizophrenia are more consistent in their reasoning than healthy controls.

## 1 Introduction

Interacting with others frequently involves making common-sense inferences linking context, background knowledge and beliefs to utterances in the dialogue. However, sometimes it is not obvious how a particular contribution should be interpreted in terms of the underpinning assumptions warranting an inference. In dialogue involving participants who demonstrate atypical linguistic behaviour, such as people with a diagnosis of schizophrenia, the effects may be even more marked. In this exploratory study we consider the *topoi* – underpinning warrants – evoked in triadic dialogue involving people with a diagnosis of schizophrenia, focusing on the variety of topoi drawn on by patients and controls respectively.

## 2 Background

In addition to the traditional inter- and intrasentential structures normally assumed in linguistic theory such as questions, dialogue requires us to deal with phenomena such as clarifications, repair, overlap and split utterances. These can all be linked to reasoning in dialogue (Jackson and Jacobs, 1980; Breitholtz and Cooper, 2011; Breitholtz, 2014; Breitholtz and Howes, 2015). Reasoning in dialogue is *enthymematic*, that is, the arguments presented lack some premises which would be required in a fully logical chain of reasoning. Instead, enthymematic arguments (*enthymemes*) rely on notions or warrants in the minds of the listeners. These are often

referred to as *topoi* (Aristotle, ca. 340 B.C.E./2007; Ducrot, 1988; Anscombe, 1995). When we interact we expect certain topoi to be common ground, or to be accommodated (adopted by dialogue participants) during the course of the interaction. If conversational participants access different topoi to serve as underpinnings for a particular argument, this may lead to misunderstandings and other disruptions in the dialogue. In this exploratory study we look at the topoi used in dialogues where participants are asked to make a decision regarding a moral dilemma.

## 3 Experiment

Building on work presented in (Howes et al., 2021), we take a more detailed look at the specific topoi provided in dialogues with a person with a diagnosis of schizophrenia, compared to control dialogues.

### 3.1 Data and analysis

The data (described elsewhere, e.g. Lavelle et al., 2013; Howes et al., 2021) consists of 38 triadic dialogues where participants discuss a moral dilemma and reach agreement about which of four people in a hot air balloon should jump to save the other three. Half of the dialogues include a person diagnosed with schizophrenia, with their two interlocutors unaware of their diagnosis, while the other half are between three healthy controls.

#### 3.1.1 Annotation

As a point of departure we used the data from (Howes et al., 2021) and extended the annotations of turns which provided a reason to specific topoi. The authors developed a topos coding schema based on four sample dialogues, two involving people with a diagnosis of schizophrenia and two control dialogues, which was then given to two annotators to apply to the whole dataset. For each reason coded in the data, the annotators were asked

to choose one of several topoi from a drop down menu (see (1) and (2), below). The topoi differed depending on which of the balloon passengers the reason was related to, however, for this preliminary study we looked only at the reasons given for or against saving the balloon pilot, who is described in the instructions as the only one with any balloon flying experience.

The list of topoi given to the annotators included the following possible topoi:

- (1) For saving the pilot
  - (a) If the pilot is the only one who can fly the balloon you need to keep the pilot;
  - (b) If the husband dies the wife might get upset;
  - (c) If the pilot is thrown out, the child will be fatherless;
- (2) For not saving the pilot
  - (a) If one of the passengers is sacrificing themselves they might as well be thrown out;
  - (b) If someone other than the pilot could fly the balloon, the pilot is expendable;
  - (c) If you are going to leave a legacy then you can be sacrificed;
  - (d) If you are married to someone you know some of what they know;
  - (e) If piloting is not hard, then anyone can do it;
  - (f) If the balloon will crash anyway, the pilot might as well be thrown;

If the annotators found that none of the given topoi was suitable they were instructed to add their own. Additional topoi supplied by the annotators during the annotation task were:

- (3) For saving the pilot (all Annotator 1)
  - (a) If someone is going to be difficult to throw over they should not be sacrificed
  - (b) If a pair of people may reproduce they should be saved / If someone has a family they should be saved
  - (c) The pilot of an aircraft is not necessarily responsible for accidents
  - (d) If someone is a little person they don't weigh a lot
- (4) For not saving the pilot
  - (a) If someone is responsible for the situation they should be sacrificed (Ann1) / If someone is responsible for the crash they should jump (Ann2)
  - (b) A reason to save someone has to be unique to the person (Ann1) / If there is nothing special about you, you can be sacrificed (Ann1) / If the others are more valuable you can be sacrificed (Ann2)
  - (c) If someone can be replaced in their romantic relationship then they should be sacrificed (Ann1)
  - (d) If you die someone else can take care of your child (Ann2)
  - (e) If someone is an adult man they are heavy so throwing them is more effective (Ann1) / If someone is very fat they should be sacrificed (Ann1) / If someone is an adult man they weigh a lot (Ann1) / If someone is heavy then they can be thrown out (Ann2)
  - (f) If someone is an adult man they can be sacrificed (Ann1) / If you are an adult man you are more likely to survive a fall from a hot air balloon (Ann1)
  - (g) The person whose idea it was to throw someone off should be the one who gets thrown (Ann1)

- (h) If someone has lived a long time they should not be saved (Ann1) / If someone has lived a long life they can be sacrificed (Ann2)

As can be clearly seen in (4a) and (4h), for example, several of the additional topoi were recognised by both annotators, despite not appearing on the list. Those that received 3 or more annotations or clearly matched were therefore included as categories in their own right in the inter-annotator agreement calculations, with the rest being allocated to an 'other' category. This resulted in 4 categories for saving the pilot with Cohen's kappa  $\kappa = 0.792$ , and 12 categories for not saving the pilot  $\kappa = 0.659$ . For the following results we use the annotations from Annotator 1.

## 4 Results and Discussion

199 of the 206 (97%) reasons given for saving the pilot were taken from the topoi shown in (1), with 146 (71%) of these being annotated as (1a). The reasons for not saving the pilot were more diverse, with 151 of 215 (70%) coming from the list provided in (2), (48 (2b); 22%) and 39 (2e); 18%) and a further 40 from the added topoi in (4a) (19%).

All dialogues contained at least two reasons for or against saving the pilot, with a range from 2 to 10. However, only 6 (33%) of the patients provided more than one reason for saving or not saving the pilot compared to 25 of their partners (66%;  $\chi_1^2 = 5.21, p = 0.02$ ) and 40 of the healthy controls (70%). Additionally, in the control dialogues, arguments are more likely to be taken up by more than one participant – 57 out of 112 topoi (51%) are associated with turns by more than one participant in the same dialogue, compared to 24 out of 64 in the patient dialogues (38%) though this does not reach significance ( $\chi_1^2 = 2.94, p = 0.086$ ).

This suggests, in line with the qualitative results of (Howes et al., 2021) that people with a diagnosis of schizophrenia are more consistent in their reasoning and use less varied arguments than non-patients. One such example can be seen in (5) where the patient argues that the pilot messed up and therefore should be thrown based on the topoi that if someone is responsible for a situation they are the one that should be sacrificed – a topoi that the patient returns to much later in the dialogue.

- (5) **lines 58-62** If he messed up that to that point. **lines 132-135** I just feel if he messed up to this point, I don't know what he's doing there.

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